

CLAIMS

What is Claimed is:

1. A method for calibrating a near infrared (NIR) measurement device to a subject, said method comprising

the steps of:

- forming a data set comprising a plurality of data terms for said NIR measurement device;
- augmenting said data set by forming cross-products terms using said data terms;
- forming a plurality of subsets having a first specified number of members randomly selected from said data set;
- evaluating each of said plurality of subsets against a set of reliable measurement results for said subject;
- selecting one of said subsets based on a preselected set of criteria; and
- using said selected set to form an optimal calibration for said device to said subject.

2. The method of claim 1 wherein the step of forming cross-products further comprises forming second and third order terms.

~~sub 43~~ 1. The method of claim 1 wherein the step of forming a plurality of subsets sets further comprises the forming of subsets sets having at least one alternative specified number of members, said alternative number(s) unequal to said first number.

4. The method of claim 3 wherein the step of selecting one of said subsets further comprises a comparison of the subsets having said first number of members with the subsets having said alternative number(s) of members.

5. The method of claim 1 wherein the step of selecting one of said subsets further comprises performing a cross validation study for at least one subset.

6. The method of claim 1, wherein said device measures blood glucose levels in said subject.

7. The method of claim 1 wherein said set of reliable measurement results for said subject are taken from more than one of said subject's fingers.

~~sub 44~~ 8. The method of claim 7 wherein said set of reliable measurement results is amended by duplicating, at least once, the measurement results taken from any one of said three fingers.

9. The method of claim 1 wherein said set of reliable measurement results is amended by duplicating, at least once, at least one of the measurement results to produce at least one alternative calibration.

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10. The method of claim 9 wherein said set of reliable measurement results are divided into at least one range of values.

10 11. The method of claim 10 wherein said set of reliable measurement results is divided into a low range, a high range, and middle range.

15 12. The method of claim 11 wherein each of said low, high and middle ranges is further divided into smaller ranges.

20 13. The method of claim 11 wherein said device measures blood glucose levels in said subject and wherein said set of reliable measurement results is divided into ranges below 120 mg/dL, greater than 240 mg/dL, and between 120 and 240 mg/dL.

25 14. The method of claim 10 wherein the step of using said selected set to form an optimal calibration further

comprising using one of said alternative calibrations over each of said ranges of values.

15. The method of claim 1 wherein said data set further comprises non-optical data terms.

46AS 16. A method for calibrating a non-invasive NIR blood glucose device measurement to a subject, said method comprising the steps of:

- 10 - forming a data set comprising a plurality of data terms for said NIR measurement device; augmenting said data set by forming cross-products terms using said data terms;
- 15 - forming a plurality of subsets having at least one specified number of members randomly selected from said data set;
- evaluating each of said plurality of subsets against a set of reliable blood glucose measurements for said subject;
- 20 - selecting one of said sets based on a preselected set of criteria, including the ability of the subset to predict said set of reliable blood glucose measurements for said subject; and

- using said selected set to calibrate said NIR blood glucose measurement device to said subject.

5 17. A non-invasive device for measuring blood glucose levels in a subject, said device comprising:

- means for gathering a plurality of data terms using NIR energy;
- means for storing said plurality of data terms in a data set;
- means for augmenting said data set with at least one cross-product term formed from said data terms and;
- means for forming a plurality of subsets from said data set;
- means for evaluating each of said plurality of subsets against reliable blood glucose level measurements for said subject; and
- means for selecting at least one of said subsets to calibrate said device to said subject.